

DRAFT WORKPLAN

FOR THE 1981-82

**San Francisco Bay
Areawide Water Quality
Management Program**

JUNE 1980

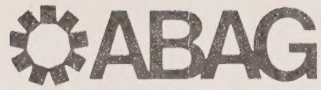
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Prepared by the staff of the

ASSOCIATION OF BAY AREA GOVERNMENTS



Association of Bay Area Governments

Hotel Claremont • Berkeley, California 94705 • (415) 841-9730

June 3, 1980

Mr. Jesse M. Diaz, Project Manager
Water Quality Management Special Projects
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95801

Dear Mr. Diaz:

ABAG is pleased to submit the following proposed projects for the 1981-82 San Francisco Bay Area Water Quality Management Program workplan. We have identified projects which are designed to bring to completion our planning program for non-point pollution and lead to widespread acceptance and implementation of control measures. These include implementation of local regulatory programs, development of end-of-pipe marsh treatment alternatives, on-site disposal management programs, and a regional spills management plan.

We have also developed several other non-point pollution control projects for which the ready identification of solutions has been hampered by a lack of data or national experience. Such problem areas include oil and grease in urban runoff, implementation of rural runoff controls, defensible identification of watercourse protection zones, and modification of engineering practices geared not to pollution control but stormwater transport.

The enclosed projects represent staff proposals at this time. Staff priorities have been established for the work which is presented in descending order. In different respects, all of the proposals are viewed as important to achieving and maintaining water quality improvements in the Bay Area.

We intend in the near future to have local policy level guidance on priorities and will forward this input to you as soon as we receive it. We would welcome the opportunity to work closely with you as the State develops further its priorities and programs for FY 81-82. If we should need any additional information or



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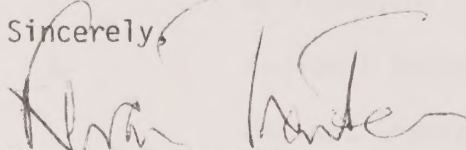
Mr. Jesse M. Diaz

June 3, 1980

Page two

clarification to the enclosed proposals, please contact me or
Terry Bursztynsky, Water Quality Program Manager.

Sincerely,

A handwritten signature in dark ink, appearing to read "Revan A.F. Tranter". The signature is fluid and cursive, with a large, sweeping initial "R".

Revan A.F. Tranter
Executive Director

Enclosure: ABAG Proposals for FY 81-82

SUMMARY OF ABAG'S FY 81-82 WATER QUALITY PLANNING PROGRAM PROPOSALS

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URBAN RUNOFF TREATMENT THROUGH WETLANDS RESTORATION

Problem Area

Pollution from surface runoff is a priority problem in the Bay Area as well as throughout the State of California. Surface runoff annually contributes 50 percent of the total suspended solids loading to all waters of the San Francisco Bay system and up to 100 percent of the loading to inland waters. A substantial part of the heavy metal load to the Bay - 33 percent - is primarily associated with this source. The estimated total metals loading is 1.7 million kilograms/year (expressed as chronic toxicity equivalent of chromium) and is entered to the system in the forms of As, Cd, Cr, Cu, Hg, Ni, Pb and Zn. In sufficient concentrations, any of these can have damaging effects on aquatic animals and plants. Estimated concentrations of heavy metals are an order of magnitude higher in surface runoff from urban areas than non-urban areas or Delta outflow. Urban areas account for two-thirds of the metals from surface runoff and are a significant pollutant source of other important urban runoff constituents which include BOD, pesticides, organics and oil and grease.

The ABAG Surface Runoff Program has evaluated and recommended a number of pre-treatment methods at the pollutant sources - particularly street surfaces and construction areas. Local communities often have difficulty implementing these measures such as street sweeping and catch basin cleaning because the equipment and the operation schedule is inefficient and funds for public works measures have been cut back as local budgets have decreased.

An alternative to pre-treatment at the pollutant source, which often must cover a large area and is labor and equipment intensive, is treatment of the surface runoff stream before it enters the Bay system. This can supplement public works practices and provide a workable alternative to communities that have difficulty controlling pollutants at their source.

Objective and Approach

This program proposes to prepare a Bay Area marsh restoration program for use in urban runoff treatment, as well as to design and implement a demonstration Marsh restoration project for treatment of urban runoff. Treatment of urban runoff through a wetlands system can be an effective low-cost method of removing pollutants and protecting downstream and Bay water quality. This natural treatment and polishing process is compatible with most beneficial uses of marshes and can serve as a practical reason for the restoration of former marsh areas.

ABAG, in 1978-80, conducted and prepared for EPA a State of the Art review of pollutant control through hydraulic/vegetative practices. At the same time, a field study was performed at the Palo Alto Flood Basin on treatment of stormwater runoff through a marsh/flood basin. In the Palo Alto study, the wetlands were found to significantly remove suspended sediments and associated pollutants and absorb trace heavy metals. The results of the two studies indicated a potential for urban runoff treatment at wetlands and potential wetlands in other Bay Area communities. The natural treatment capabilities of wetlands systems could become a vehicle for obtaining public/private funding for wetlands restoration and management and would serve well the multiple purpose uses of wetlands.

A four hundred acre marsh restoration project is currently being proposed for the Fremont area by the East Bay Regional Park District (EBRPD). The proposed marsh area drains urban portions of Fremont. This presents an ideal opportunity for the incorporation of multi-purpose uses such as urban runoff treatment, wildlife habitat maintenance and recreation. In addition, the Bay Conservation and Development Commission (BCDC) is preparing a study of all diked wetlands in the Bay Area in order to develop future management guidelines for existing and potential Bay Area wetlands.

This program will consist of the following tasks and sub-tasks in three phases. This proposal is for Phase I activities only.

Phase I

1. Develop regional wetlands management and restoration program emphasizing urban runoff treatment as a beneficial use.
 - a. Review existing data on wetlands treatment of stormwater and evaluate the potential for treatment of urban runoff through wetlands in the Bay Area. Based on previous ABAG and other local studies, criteria for design and operation of a wetlands treatment system will be prepared.
 - b. Integrate a multi-purpose wetlands management and restoration program into other local programs. This involves coordination with the BCDC "Diked Wetlands Study" which identifies existing and historic shoreline marsh areas and their potential for restoration into fresh water, brackish and/or saltwater wetlands. ABAG would supplement the BCDC study through the evaluation and preparation of design criteria for inland freshwater marsh restoration with urban runoff water.
 - c. Develop a regional urban runoff treatment through wetlands program emphasizing multi-purpose wetlands management and restoration. A map of existing and potential wetlands areas suitable for urban runoff treatment and other beneficial uses will be prepared in cooperation with BCDC. Guidelines and design criteria will be developed to aid local communities that wish to implement this type of system.
 - d. Develop an implementation plan for wetlands restoration and multi-purpose wetlands management to include urban runoff treatment where feasible. This would develop sequentially from the BCDC Diked Wetlands Study and would be coordinated between ABAG and BCDC.
2. Develop demonstration project on marsh creation and urban runoff treatment.
 - a. Prepare conceptual plans and obtain permits for demonstration project at Coyote Hills Regional Park.

- b. Provide urban runoff characterization for the watersheds draining to the demonstration marsh and establish performance criteria.
- c. Design of marsh-treatment systems at Coyote Hills Regional Park in coordination with EBRPD and Alameda County Flood Control and Water Conservation District.

Phase II

Construct demonstration project on marsh creation and urban runoff treatment. The Coyote Hills Marsh-urban runoff treatment project will be constructed during this second phase. When completed, the project will not only provide urban runoff treatment, but will additionally yield wildlife habitat, recreational use, educational resources and open space/public access.

Phase III

Operation of marsh-treatment system demonstration project. The wet season performance of the created marsh area will be monitored and adjustments will be made to the system where necessary. The functioning marsh-treatment system will serve as an example to local communities that are interested in implementing this alternative type of urban runoff treatment.

Schedule

Phase I - July 1981 to June 1982
Phase II - July 1982 to June 1983
Phase III - To be determined

Participants

ABAG
Bay Conservation and Development Commission
East Bay Regional Park District
Alameda County Flood Control and Water Conservation District

Budget

Phase I

Task 1. Regional Wetlands Management and Restoration Program

- | | |
|--|----------|
| a. design and operation of a wetlands treatment systems | \$20,000 |
| b. integrate wetlands treatment systems with BCDC "Diked Wetlands Study" | 20,000 |
| c. develop regional wetlands management and restoration program | 60,000 |
| d. develop implementation program | 40,000 |

Task 2. Develop demonstration projects on urban runoff treatment and marsh creation

- | | |
|---|--------|
| a. prepare conceptual plans | 10,000 |
| b. runoff characterization and performance criteria | 20,000 |
| c. design of marsh treatment system | 40,000 |

Project management and interagency coordination	15,000
Public information	15,000
Environmental Assessment	<u>10,000</u>

Subtotal, Phase I	\$250,000
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Federal Funds	187,500
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Phase II

Construction of demonstration project	tentatively \$250,000
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Phase III

Operation and monitoring of demonstraion project	to be determined
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Highlights

- o Development of regional program on urban runoff treatment through wetlands, emphasizing wetlands management and restoration.
- o Design and construction of a demonstration project on a marsh-treatment system as an alternative method to controlling pollutants from urban runoff.
- o Operation of an artificially-constructed marsh-treatment demonstration project that serves multi-purpose uses and can be made applicable to other Bay Area communities.



EAST BAY REGIONAL PARK DISTRICT

11500 SKYLINE BOULEVARD/OAKLAND, CALIFORNIA 94619/TELEPHONE (415) 531-9300

BOARD OF DIRECTORS: MARY LEE JEFFERDS, President; WILLIAM F. JARDIN, Vice President; HARLAN KESSEL, Secretary;
WALTER H. COSTA, Treasurer; HOWARD L. COGSWELL, JOHN J. LEAVITT, TED RADKE □ RICHARD C. TRUDEAU, General Manager

May 30, 1980

Ms. Carla Bard, Chairperson
State Water Resource Control Board
P. O. Box 100
Sacramento, CA 95814

Re: Proposed 1981-82 Water Quality Planning Program for the San Francisco Bay Area

Dear Ms. Bard:

I have reviewed the above program and support the Urban Runoff Treatment Project being proposed. Specifically, I would strongly encourage favorable review and approval of Phase I funding which would initiate an innovative concept definitely worth pursuing.

As you are probably aware, the East Bay Regional Park District has and continues to be very active along San Francisco Bay. We recently returned more than 200 acres of diked land to marsh habitat at Hayward Regional Shoreline and intend to open more acreage to tidal influence in the future. We are also interested in improving the marsh habitat at Coyote Hills Regional Park. If we are able to expand the project scope and accomplish multiple goals, all concerned will benefit. The concept as proposed by the Association of Bay Area Governments is worthy of your support and endorsement.

The East Bay Regional Park District would like to participate in the project depending upon the outcome of your deliberations.

Sincerely,

Richard C. Trudeau
General Manager

RCT:DDB:ja

cc: Terry Bursztynsky



City of Fremont

City Government Building
Fremont, California 94538

May 29, 1980

Mr. Richard C. Trudeau
General Manager
East Bay Regional Park District
11500 Skyline Blvd.
Oakland, CA 94619

C

Subject: Coyote Hills Marsh Expansion Programs

Dear Dick:

The City of Fremont is excited about the possibility of expanding the freshwater marshes at Coyote Hills. The mutual plans of the City and the District have called for the development of hundreds of acres of marsh, both for its wildlife value and for its educational value.

O

We hope that the East Bay Regional Park District will be able to accomplish a marsh expansion program in the near future. You have the City's full support.

P

Sincerely,

Larry Milnes

LARRY MILNES
Community/Economic Development Manager
City of Fremont
(415) 791-4169

Y

LM:sg

cc: Emy Chan
Association of Bay Area Governments
Hotel Claremont
Berkeley, CA 94705

REGIONAL EMERGENCY SPILL RESPONSE PLAN

Problem Area

The U.S. Coast Guard reports an average of one oil or hazardous material spill a day in the Bay Area. Numerous other agencies such as the EPA, State Department of Fish and Game, and Caltrans also report spill incidents within their own jurisdictions. Unfortunately, agency jurisdictions often overlap and not all spills are recorded, making it difficult to assess the total occurrence of hazardous spills in the region.

In addition to these spills of oil and hazardous materials, Caltrans responds an average of four times more often to "non-hazardous" spills on roadways than to hazardous ones. These seemingly nonhazardous materials can have extremely adverse effects on water quality and aquatic life. Truck spills of wine, milk, corn syrup and sawdust have occurred in the Bay Area. Lack of containment of these spills has lead to fish kills and destruction of aquatic habitat in nearby streams and localized areas of the Bay.

The difficulty in determining the overall incidence of spills in the Bay Area reflect the following regulatory and management problems:

- o Experience of responding agencies, such as the California Highway Patrol, indicates that many spills are never reported. This is due in part to the nature of spills (variable causes, severity, visibility and location).
- o There is a multiplicity of agencies involved with the handling of oil and chemical spills. These include Caltrans, Coast Guard, Highway Patrol, Offices of Emergency Services and local fire departments.
- o There is a lack of available data on spills responded to and cleanup methods used by local fire departments. Of ten local fire departments surveyed, only one had records available on the number of spills responded to in a year.
- o The reporting of and response to spills focuses on oil and hazardous materials, discounting the significance of nonhazardous, but polluting materials.
- o The definition of a hazardous substance varies, leading to inconsistent response policies for handling "nonhazardous" materials. The California Administrative Code identifies 791 materials as hazardous. The Coast Guard identifies 1260 materials. In practice, the State Department of Fish and Game considers any substance to be potentially hazardous to waterways.

The reporting and handling problems outlined above result from the general lack of consistency among local, State and Federal agencies in dealing with spills. For this reason, it has been recommended that the San Francisco Bay Area Water Quality Management Plan include Action 12.9: "prepare and implement a regionally coordinated chemical spill response plan."

Objective and Approach

The goal of the project is to develop a coordinated program in the Bay Area that deals with oil and chemical spills. The program will focus on developing regional and local equipment and personnel capabilities to deal with any type of spill. The following is a list of objectives:

Phase I

- o Identify region's total spill response capabilities (manpower, training, equipment, jurisdictions)
- o Analyze objectives for response capabilities
- o Analyze deficiencies and needs in regional response capabilities (regional/subregional centers, networks)
- o Prepare coordinated regional spill response plan

Phase II

- o Identify specific initial response training programs presently underway
- o Analyze training objectives, deficiencies and needs
- o Coordinate training programs

Phase III

- o Identify physical and organizational constraints and obstacles
- o Identify and seek material, personnel, institutional changes and resources necessary to overcome constraints
- o Implement response program

ABAG would form a task force of representatives from all participating agencies to establish policy and formally develop the program. ABAG would work with the task force to develop a program and will provide the necessary technical and support staff.

Schedule

July 1981 - December 1982

Participants

ABAG
County Offices of Emergency Services
County Fire Chief's Association
County Health Officers
Public Works Departments

(Participants, con't)

Police services
Bay Area haulers and transporters
Bay Area chemical manufacturers
Caltrans
California Highway Patrol
State Office of Emergency Services
State Health Department
State Department of Fish and Game
Regional Water Quality Control Board
EPA
Coast Guard

Representatives from the above agencies that have been contacted recognize the critical nature of the problem and offer their support. Recommendations for the regionally coordinated response program have been reviewed and approved by the Water Quality Planning Program's Technical Advisory Community, Regional Planning Committee, and Work Program and Coordination Committee.

Budget Summary

	Phase I
Identify region's response capabilities	\$60,000
Analyze objectives for response capabilities	20,000
Analyze response deficiencies and needs	60,000
Prepare response plan	60,000
Project management and policy guidance	10,000
Public information and participation	<u>10,000</u>
Total	\$220,000
Federal Funds	\$165,000

Highlights

- o Coordination of the many agencies involved with handling oil and chemical spills in the Bay Area.
- o Identification and analysis of region's total response capabilities.
- o Development of common goals and policies for handling spills that are consistent with water quality protection.
- o Development of coordinated regional spill response plan.
- o Increase in responding agencies' awareness of the problems associated with typical nonhazardous material spills and the need for their containment.

OIL AND GREASE CONTROL

PHASE II WORKPLAN

Control of oil and grease in urban stormwater runoff is important in the protection of receiving water quality. This project interfaces with Phase I of the Oil and Grease Control Program which is being conducted in 1980-81. The primary goal of Phase II is to demonstrate the best management practices (BMPs) selected through the Phase I project as being most promising for control of these urban stormwater contaminants. The funding for any equipment or facilities construction necessary to implement the BMP(s) designed during Phase I would tentatively be supplemented by the Municipal Environmental Research Laboratory, Edison, N.J. Funding to assess the effectiveness of the BMP(s) is requested in this proposal for a Section 208 Grant.

Introductory information and a description of the Phase I workplan for the Oil and Grease Control Program (Tasks 1 through 8) are given in Appendix A. A detailed description of each of the six tasks in Phase II of the Oil and Grease Control Program is as follows.

PHASE II

Task 9 - Implement Selected BMPs

The first year program effort would conclude with the recommendation of specific control measures for demonstration and testing, with detailed design specifications for the installation of such control measures in the Richmond watershed and with detailed plans for the selected BMPs. If a second year effort is funded, it would commence with the implementation or installation of selected BMPs. The following steps are envisioned in this task:

- 1) Approval would be sought from the City of Richmond and appropriate private parties for the implementation of control measures. (This task could be performed during Phase I if a second year effort becomes foreseeable.)
- 2) Contractors would be selected for the implementation of BMPs.
- 3) The selected BMPs would be implemented or constructed.

Schedule

July 1981 - November 1981

Product

Best management practices selected for demonstration in the watershed would be installed or implemented prior to the second year's sampling program.

Responsibility

RAMLIT Associates with assistance from the City of Richmond, and unspecified contractor.

Total Budget

\$60,000 plus supplemental funds from U.S. Environmental Protection Agency; Municipal Environmental Research Laboratory, Edison, N.J.

Task 10 - Monitor Effectiveness of BMPs

To assess the effectiveness of the implemented Best Management Practices water quality samples would be collected after installation. Samples would be obtained from the receiving waters, BMP discharge, and any fraction retained by the BMP. Analysis of the samples would match those of the first year's program in order to obtain comparable data on oil and grease removal.

Schedule

December 1980 - March 1981

Product

The second year sampling and field data collection effort will identify:

- o quantities of oil and grease discharged
- o relative retention of major components comprising oil and grease
- o quantities of oil and grease captured or reduced in the runoff
- o operating needs and characteristics of the selected BMPs

Responsibility

RAMLIT Associates, ABAG and laboratory consultant

Total Budget

\$60,000 plus supplemental funds from U.S. Environmental Protection Agency; Municipal Environmental Research Laboratory, Edison, N.J.

Task 11 - Data Analysis

Data collected from the first and second years' sampling programs will be analyzed to establish the relative effectiveness of the selected BMPs in reducing oil and grease pollution. This analysis will result in recommendations on the further implementation of control measures in this and other watersheds. Recommendations would be based upon factors of unit effectiveness, cost, ability to achieve desired mass emission reduction and feasibility of implementation.

Schedule

February 1981 - May 1982

Product

This task will produce the major report of the project: namely, an analysis of the effectiveness of the demonstrated control measures and recommendations for future implementation.

Responsibility

ABAG

Total Budget

\$25,000 plus supplemental funds from U.S. Environmental Protection Agency; Municipal Environmental Research Laboratory, Edison, N.J.

Task 12 - Incorporation of Implementation Experience into Design Criteria

The experience gained through implementation of selected BMP(s) will likely dictate some changes and refinements toward optimizing oil and grease control strategies. In particular, the recommendations resulting from Task 11 would be a prime source of input for improving the BMP design. This task provides a way by which solutions to any problems encountered in this initial implementation may be explicitly incorporated into future designs without necessitating methodical and repeated revision of the initial design by the municipalities that would use the BMP's.

Schedule

April 1982 -- September 1982

Product

Detailed revision of the design specifications produced in Phase I, Task 6. Construction drawing and documents will be prepared or revised as necessary.

Responsibility

RAMLIT Associates and ABAG with the assistance of the City of Richmond.

Total Budget

\$20,000

Task 13 - Model Calibration

In order to obtain the ability of transferring the results of this investigation to other watersheds, oil and grease coefficients would be developed for use in mathematical simulation of stormwater runoff. The SWMM model, which has been set up and run on this watershed, will be used in order to significantly reduce the cost of modeling efforts.

This model will have been calibrated for uncontrolled oil and grease runoff as part of Phase I, Task 4. It is intended that alternate calibration factors or model coefficients, representing a watershed with control measures, would be developed.

Schedule

March 1981 - June 1982

Product

A mathematical model would be produced which could be used to predict the effects of control measure implementation upon oil and grease discharges in other watersheds.

Responsibility

ABAG

Total Budget

\$8,000

Task 14 - Provide Management and Reporting

Management of the project involves coordination of staff, consultants and City of Richmond personnel. Contracts must be administered and reports presented to the Regional Planning Committee and the ABAG Executive Board. Close liaison will be maintained with the EPA Project Officer, the Municipal Environmental Research Laboratory, and interested parties from the State Board.

Technical assistance will be sought and obtained from the ABAG Water Quality Technical Advisory Committee which includes members from private industry, consulting firms, local government and several state and federal agencies, including the Regional Board. This Committee would bring an expanded perspective and experience to the project in addition to providing peer review of the technical products.

Quarterly progress reports will be submitted to EPA. The reports will cover progress to date, results, problems, corrective measures, and an estimate of the next quarter's effort.

A year end project report would be submitted to EPA. This report would cover the same topics as the quarterly reports, yet would also include methodology, data analysis, findings and recommendations.

Schedule

July 1981 - September 1982

Products

The products of this task would include coordination of project staff and activities, three quarterly reports and a year end report for Phase I, and three quarterly reports and a year end report for Phase II.

Responsibility

ABAG

Total Budget

\$25,000

Task 15 - Conduct Public Information and Participation Program

Dissemination of information on this program will occur mainly when the results of the studies are known and best management practices are being proposed to control runoff of oil and grease into Bay Area waters.

The ABAG Public Affairs staff will:

- 1) Assist with the development of graphics, printed materials and presentations for the ABAG Water Quality Technical Advisory Committee, Bay Area Citizens Advisory Committee, Regional Planning Committee, and other concerned groups.
- 2) Handle physical arrangements, agendas, mailings and publicity for advisory meetings, workshops and any public hearings that may be required.
- 3) Work with affected persons and groups in the community to explain the purposes of the study and how it may affect them.
- 4) Maintain liaison with concerned government agencies and water-related organizations.
- 5) Maintain mailing lists for informational materials, meeting notices and news releases.
- 6) Handle media contacts related to the program as it develops.

Schedule

July 1981 - September 1982

Product

Advisory and policy committee meetings; public meetings and hearings; news media interviews and stories; fact sheets and plan summary; mailing lists; correspondence and responses to telephoned and written inquiries and public comments; articles for professional meetings and publications; responsiveness summary and evaluations; adopted best management practices.

Responsibility

ABAG

Total Budget

\$12,000

Budget Summary

9. Implement selected BMPs	\$60,000 ^{a+}
10. Monitor effectiveness of BMPs	60,000 ^{a+}
11. Data analysis	25,000 ^{a+}
12. Incorporation of implementation experience into design criteria	20,000
13. Model calibration	8,000
14. Provide management and reporting	25,000
15. Conduct public information and participation program	12,000
<hr/>	
Total	\$210,000 ^{a+}
Federal	157,500 ^{a+}

- a. Tentative supplemental funding of approximately \$100,000 from the USEPA, Municipal Environmental Research Laboratory, Edison, N.J.

Highlights

- o Demonstration of effectiveness of BMPs designed to reduce oil and grease in urban runoff
- o Improved designs for oil and grease control BMPs
- o SWMM model calibration for oil and grease loads in urban runoff
- o Heightened public awareness of the runoff - oil and grease problem and assurance that its abatement is not beyond a feasible effort for urban areas

DEMONSTRATION OF ON-SITE WASTEWATER MANAGEMENT AT THE COUNTY LEVEL

Problem Area

Approximately sixty percent of ABAG's 208 water quality planning boundaries include open and rural lands, where sewage disposal is provided to a large extent by decentralized, on-site disposal systems. ABAG's 208 Environmental Management Plan has identified many locations with known water quality problems resulting from inadequate or improper design, construction maintenance or operation of such systems. Widespread and increasing dependence on such systems may compound such problems in the future. Stringent requirements for use of such systems exist. However, their implementation is not always effective because of inadequate area-wide management. Coordinated public management is recognized as the most reliable means of assuring water quality protection and effective long term operational performance. Many technical, fiscal and administrative aspects of On-Site Wastewater Management (OSWM) need attention before wider application can be achieved.

This project will serve as a working example of OSWM for other counties in the ABAG planning area, throughout California and perhaps elsewhere in the U.S. Marin County was selected as a demonstration area because of many known on-site wastewater problems and because of the notable efforts made to address these problems through public management programs. In 1971, all new unsewered houses were placed in a countywide OSWM District for the purpose of conducting routine inspection of systems. Also, in 1977, Stinson Beach became one of the state's first OSWM Districts formed to resolve on-site waste disposal problems in an existing, unsewered community. Numerous OSWM issues remain unresolved:

- (1) Approximately 500 homes are included in the county-wide inspection program while some 9,000 constructed prior to 1971 are excluded.
- (2) The expanding use of on-site systems in Western Marin poses potential threats to local water supply reservoirs upon which the county is heavily dependent.
- (3) Cumulative groundwater impact studies were recently conducted for the Inverness and Black Point areas. Potential recurrence of water shortages makes the long-term protection of groundwater resources critical for developing areas throughout the County.
- (4) The presence of adverse soil, slope and groundwater conditions in many areas has prompted active interest in alternative system designs. Public management of alternative systems is required by the Regional Board to assure responsible inspection, monitoring and maintenance.

Objective and Approach

The objective of the proposed project is to develop and demonstrate the technical and administrative means of providing comprehensive on-site wastewater management through county government. Using Marin County as the demonstration area, the project will address the following management issues:

- o Coordinated planning for land use development and long-term surface and groundwater protection;
- o Site evaluation criteria and methods;
- o Standard and alternative system design requirements;
- o Construction inspection and supervision;
- o Operation and maintenance functions;
- o System monitoring, inspection and rehabilitation/repair;
- o Education and training needs;
- o Institutional arrangements, including formation of local districts;
- o Financing means.

The project will consist of the following:

- o Delineation of site conditions and on-site system suitability for specific geographic areas of the county;
- o Refinement of site inspection, design, performance and maintenance requirements for defined geographic areas and for standard and alternative system types;
- o Identification and characterization of affected ground and surface water resources and preliminary assessment of potential development impacts;
- o Review, analysis and refinement of county-wide inspection and monitoring program; investigation and ranking of excluded areas for phased incorporation into the program;
- o Formulation of a County-wide On-Site Wastewater Management Program, addressing administrative, institutional and financial concerns;
- o Development and demonstration of educational/training program for homeowners and involved technical personnel in the public and private sector.

Schedule

July 1981 - August 1982

Participants

ABAG
Marin County
Consultant

Budget

Site Suitability	\$40,000
Criteria Refinement	20,000
Ground and Surface Water Assessment	25,000
Inspection and Monitoring Program	20,000
County Management Program	65,000
Education/Training	30,000
Project Management	<u>40,000</u>
TOTAL	\$240,000
Federal Funds	180,000

Highlights

- o Development and demonstration of coordinated county-wide on-site wastewater management program;
- o Potential regional, state and national application of demonstrated practices, procedures, etc.;
- o Controlled and improved application of alternative on-site system designs;
- o Mitigation of local concerns relative to long-term protection of surface and groundwater resources and on-site system reliability;
- o Participation of county government and support by the Regional Water Quality Control Board.

DEPARTMENT OF PUBLIC WORKS MARIN COUNTY, CALIFORNIA



P.O. Box 4186 Civic Center San Rafael 94903
Telephone 479-1100

Ray W. Foreaker, Jr., Director
Lawrence H. Loder, Assistant Director
Mario Balestrieri, Chief Deputy Director
David G. Adams, Deputy Director

May 30, 1980

Mr. Terry Bursztynsky, Manager
Water Quality Programs
Association of Bay Area Governments
Claremont Hotel
Berkeley, California 94705

Dear Mr. Bursztynsky:

Today I was contacted by Mr. Mark Riesenfeld of the Marin County Planning Department regarding the possibility of the County being involved in an application for the 1981-82 208 Work Program. I subsequently discussed the matter with Dr. Yoram Litwin of RAMLIT Associates of Berkeley. The general nature of the application would be for a project entitled "Demonstration of On-Site Waste Water Management at the County Level."

This program is of particular interest to the Marin County Department of Public Works because we are involved in the permitting of septic tank systems and are attempting to come up with a way to address the possibility of using alternative sewage disposal systems where septic tanks are not workable. In our discussions with the staff of the Regional Water Quality Control Board on this issue, they have expressed a substantial interest in our being able to establish at the County level a more effective management system which would make them and us more comfortable with allowing the use of alternative systems on a greater scale as well as possibly expanding the environment in which septic tanks can be used. This is particularly significant in Marin County where we are experiencing substantial difficulties because of severe topographic problems. One agency in the County, the Stinson Beach Water District, does have a special management program at this time, but this is the only one in existence.

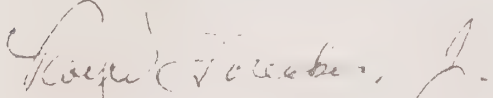
Because this matter was brought to me at such a late date, it is impossible to be involved in the development of a work program and a detailed analysis prior to the time an expression of the County's interest should be made to you. Also, necessarily I would need to bring the matter before the Board of Supervisors and also discuss it with the County Health Officer to provide for appropriate coordination and approvals. In the next several days I expect to initiate meetings at the staff level to accomplish this coordination and if that works out satisfactorily, which I assume it will, I would then expect to bring it forward to the Board of Supervisors for their endorsement.

Mr. Terry Bursztynsky
May 30, 1980

-2

In the meantime I hope this letter will be helpful to you in indicating an interest at the staff level on the part of the County of Marin in becoming involved in such a work program.

Very truly yours,



Ray W. Foreaker, Jr., Director

RWF:ch

cc: Dr. Litwin
Ramlit Associates
Claremont Hotel
Berkeley, Ca. 94705

ESTABLISH RIPARIAN PROTECTION ZONES FOR REGULATORY PROGRAMS

Problem Area

Several jurisdictions within the Bay Area have attempted but have had difficulty implementing watercourse protection ordinances, primarily due to lack of a well-defined and technically-supportable riparian protection zone. The implementation of effective watercourse protection ordinances relies upon the adoption of well-defined protection zones covering the watercourse channel, banks, and "buffer zone." The channel and banks can usually be defined by physical or topographical dimensions. However, the associated buffer zone of riparian vegetation next to the stream banks is generally difficult to determine. The definition of the size of the buffer zone is particularly important when a jurisdiction limits or controls activities on private property within a protection zone. In urban areas, this can lead to changes in construction siting, changes in property value, loss in development potential and curtailment of some activities near a watercourse. In rural areas, this can lead to changes in farming, grazing, brush clearing and timber harvesting practices.

Objective and Approach

The objective of this study will be to determine and codify the minimum width of buffer zones necessary to protect watercourses and riparian habitats in the Bay Area. Based on technical, scientific and case study data, recommended buffer zones will be determined based on land use and degree of protection required. The result will be a technical report recommending standard widths of buffer zones for various types of watercourses, and containing technical and scientific support material. The recommendations would be incorporated by jurisdictions adopting watercourse protection ordinances. Alameda County is attempting to adopt such an ordinance and has had difficulties due to inadequate technically-defensible criteria. The study approach will include.

- o comprehensive review of existing research on riparian zones and their functional size
- o review of existing watercourse protection and related ordinances which specify zones of controlled activities for riparian habitat and water quality protection
- o survey of typical Bay Area stream types, types of adjacent land use and degree of protection
- o evaluation of technical data and actual case studies for effectiveness of protection for riparian zones
- o review of regulatory agencies' jurisdictions and programs
- o development of standard sizes of buffer zones for protection of watercourses and riparian zones

- o adoption of specific riparian protection zones within the watercourse protection ordinance for Alameda County

Schedule

July 1981 to June 1982

Participants

ABAG

Alameda County Flood Control and Water Conservation District

Budget

Review of literature and ordinances	\$20,000
Survey of representative Bay Area watercourses	40,000
Data evaluation	20,000
Delineation of protection zones	12,000
Public information and reporting	15,000
Environmental assessment	8,000
Project management	15,000
<hr/>	
Total	130,000
Federal Funds	97,500

Highlights

- o Development of effective watercourse protection zones that will be compatible with local land uses.
- o Compilation of technical data to support watercourse protection zones of specific sizes.
- o Implementation of specific watercourse protection zone(s) by a local jurisdiction for water quality and riparian habitat protection.

IMPLEMENTATION ASSISTANCE FOR LOCAL GOVERNMENT REGULATORY PROGRAMS

Problem Area

Erosion of soil and sedimentation in surface waters are major problems in the Bay Area. Sediment makes streams turbid, covers fish spawning beds, fills stream beds and reduces reservoir capacity. Much of the critical erosion and sedimentation affecting Bay Area streams and lakes is caused by poor construction practices, particularly on hillsides. Recent calculations by ABAG indicate that up to 14 percent of the sediment generated in Bay Area counties comes from the 0.1 percent of the land undergoing construction. The impact of that sediment is very severe in the local watersheds experiencing the construction. In most instances, laws or regulations requiring the use of control measures for erosion have not been adopted or implemented by local governments. While many jurisdictions have grading or other development ordinances, these do not generally provide for erosion control to protect water quality.

As part of the 1979-80 Water Quality Planning Program, ABAG has been evaluating local ordinances for their ability to control construction-related erosion and sedimentations. Major deficiencies of local ordinances include:

- o lack of water quality protection objectives or criteria,
- o no requirements for comprehensive erosion and sediment control plans,
- o lack of efficient and effective regulatory procedures,
- o ineffective enforcement measures.

Objective and Approach

The objective of this program is to have, at the end of the year, effective and operative regulatory programs adopted by most jurisdictions in the Bay Area. The proposed program is the fourth phase of an effort begun with the initial preparation of the Environmental Management Plan.

Phase I - This phase involved the identification of surface runoff pollution problems and recognition of those problems by local governments. This phase, completed in 1978, identified erosion and sedimentation as the principal surface runoff problem common to most counties.

Phase II - Phase II will have been largely completed by July 1980 with some portions completed by June 1981. Phase II work identified, assessed and recommended specific measures to control erosion and sedimentation in the Bay Area. A major product of Phase II is a Model Grading and Erosion Control Ordinance - a comprehensive document delineating a complete regulatory process from permit application through to enforcement measures.

Solano County and the City of Richmond have adopted, with ABAG input, new grading ordinances which incorporated major elements of the model. By the end of the 1979-80 planning effort, it is expected that Alameda, San Mateo and Santa Clara counties will have adopted similar ordinances.

Phase III - The Phase III work effort is part of the 1980-81 Water Quality Planning Program. It will have two major objectives: (1) demonstration of the effectiveness of the regulatory programs in Santa Clara and Solano counties; and (2) adoption of similar regulatory programs by other counties and cities in the Bay Area. It is expected that as the Solano and Santa Clara experience becomes documented, approximately 75 percent of the remaining 90 plus jurisdictions could adopt similar programs.

Phase IV - This proposed program is for the implementation of Phase IV during 1981-82. It would have the following major tasks:

1. ABAG staff would revise and improve the regulatory program package to reflect the experiences of 1980-81 in the demonstration areas and improvements in control measure technology.
2. Complete the program for adoption of regulatory measures. This should affect the approximately 25 percent of jurisdictions still lacking effective programs. ABAG staff would aid local governments in evaluating their ordinances and regulatory procedures. Local governments would then be persuaded to implement needed legal and regulatory changes. ABAG staff would provide technical information, assistance in drafting ordinance amendments and changes, and assistance in organizing an enforcement program. It is also expected that jurisdictions adopting regulatory programs during Phase III would need assistance in developing full implementation of those programs.

This program would be fully coordinated with the implementation of erosion control policies of the Regional Water Quality Control Board.

Schedule

July 1980 - June 1981

Participants

ABAG

Budget

1. Revise regulatory program	\$15,000
2. Assist implementation of regulatory programs	40,000
Project management and policy guidance	5,000
Public information	10,000
Environment impact assessment	<u>5,000</u>
Total	\$75,000
Federal Funds	\$56,250

Highlights

- o Substantial reduction of construction-related erosion in urbanizing areas.
- o Regionwide adoption of regulatory programs for control of erosion and sedimentation.
- o Implementation of demonstrated, effective regulatory programs.

DESIGN OF URBAN STORMWATER COLLECTION FACILITIES TO ECONOMICALLY REDUCE POLLUTION FROM RUNOFF

Problem Area

Currently the primary design consideration for urban stormwater collection systems is prevention of flooding. No cognizance is given to opportunities for reducing the contribution to receiving water of pollutants conveyed in these systems. In many instances, however, alternative pollution preventive designs could be specified for use in newly sewered areas, at little or no additional cost.

San Francisco Bay receives a substantial portion of its solids loading via urban runoff. The lead and other toxic heavy metals associated with runoff solids constitute the largest single source of this type of pollutant to the Bay (69 percent of total non-Delta inputs). Current estimates predict that nearly 200,000 acres of newly developed land in the San Francisco Bay Area will be served by urban storm sewers by the year 2000. Consequently the importance of urban runoff as a pollutant contributor to surface waters of the San Francisco Region will grow. It is clearly advantageous to control this toxicant source but as yet little has been done to acknowledge the problem in stormwater collection system design.

As an example, recent studies at ABAG have shown that, depending on the circumstances, either street sweeping, catch basin cleaning or inlet cleaning could be the most cost effective approach to preventing solids and the associated toxicants from passing through sewers to receiving water. No governments have weighed the merits of each of these alternatives toward lessening stormwater pollution. The extent of the problem is further exemplified by the absence of pollution prevention considerations in stormwater collection system appurtenance design.

Objective and Approach

The objective of this project is to decrease urban runoff pollutant loading to sensitive receiving water bodies. Design alternatives will be examined for water quality benefits at no additional cost above the current typical expenditure. The Alameda County Flood Control and Water Conservation District has tentatively agreed to implement these types of design alternatives into the standards used to approve developers plans (pending review by the Board of Supervisors). These objectives are best accomplished in a two phase program:

Phase I: 1981-82

- o review existing storm sewer design practices and standard details for catch basins, inlets, curbs, etc.
- o evaluate existing alternatives for water quality enhancement as well as flood prevention ability. For example, ease of cleaning in the case of inlets and catch basins, improvement of sweeping efficiency in the case of curbs, etc.

- o explore means for making catch basins and other stormwater collection system appurtenances more effective in removing pollutants, such as methods for enhancing retention of fines and oily substances
- o explore means of reducing the beginning-of-storm shock load from liquid accumulated in system sumps and other low points.
- o develop a method for determining where catch basin cleaning, inlet cleaning, or street sweeping would be most cost effective in lowering pollutant levels in urban runoff (e.g. special land uses such as industrial parks, heavily trafficked highways and parking lots)
- o implement findings into local government standards where appropriate

Phase II: late 1981-82 and 1982-83

- o confirm, through sampling and data analysis, the effectiveness of stormwater collection designs emplaced by Phase I implementation
- o refine Phase I designs as warranted from Phase II reevaluation

Participants

ABAG
Alameda County Flood Control and Water Conservation District
Consultant

Budget

Phase I

Review of literature	\$ 7,000
Engineering design and evaluation	50,000
Cost/benefit assessment	10,000
Public information	9,000
Project management	9,000
	<hr/>
Total	85,000
Federal Funds	63,750

Phase II

Budgetary requirements to be resolved during Phase I.

DEMONSTRATION OF CONTROL MEASURE FEASIBILITY

Problem Area

Cull Canyon Reservoir is experiencing one of the highest sedimentation rates of any receiving water body within Alameda County. The severity of the sedimentation problem is demonstrated by its significant economic impact and its adverse effect on beneficial uses.

The economic impact is quantifiable as follows: during the first twelve years after the reservoir's construction (1962-74) over 300,000 cubic yards of sediment was removed at a cost of over \$900,000. If that sediment were removed at 1979 prices, the cost would be about \$2,500,000. Whenever a similar job is done again, the costs will be significantly increased because of inflation.

Unfortunately, the negative impact on beneficial uses is not easily quantifiable. However, there is little disagreement as to the nature of these impacts. For example, during the 1974 silt removal, most of the facilities of the regional recreation area surrounding the reservoir were closed to the public for almost two years. If a similar silt removal operation necessitates park closure again, all of the reservoir's and park's beneficial uses will be denied to the public. In 1979, usage amounted to over 279,000 visitor days. It is clear that a similar park closure for a major dredging operation would affect a significant number of people.

Each of the beneficial uses of the reservoir is impaired by the severity of the sedimentation problem. The following beneficial uses have been officially established for Cull Canyon Reservoir by the State Water Resources Control Board: REC 1 & 2 (i.e., warm freshwater habitat) and WILD (i.e., wildlife habitat).

Objective and Approach

Three actions would be implemented in the proposed project. These consist of: A. Gully stabilization demonstration project, B. Upstream sediment basin feasibility study and C. Modification of Cull Dam feasibility study.

A. Gully stabilization demonstration project. Gullies are believed to be the most severe (in terms of sediment discharge) form of erosion in Cull Canyon. A system of check dams would be installed on District property within the watershed and a program of regrading and seeding around the check dams instituted. Sediment discharge would be monitored before and after stabilization. The resulting data on the source control effort would then undergo a cost-effectiveness analysis to determine whether such stabilization can be economically applied throughout the watershed. This task accounts for 89% of the proposed budget.

B. Feasibility of upstream sediment basins. It may be more cost effective to remove sediment at upstream locations than in the reservoir. To that end, potential sites would be located, construction costs estimated

ability to intercept sediment evaluated to determine costs and feasibility. This task accounts for 7% of the proposed budget.

C. Feasibility of modification of Cull Dam. The feasibility of design changes in the dam to pass sediment through the reservoir to downstream locations where sediment removal costs may be lower would be investigated from engineering, environmental and economic perspectives. This task accounts for about 3% of the budget.

Schedule

July 1981 - June 1982

Participants

Alameda County Flood Control District

Budget

\$120,000

APPENDIX A

OIL AND GREASE CONTROL: INTRODUCTORY INFORMATION AND PHASE I WORKPLAN

PROBLEM AREA

It has been documented through ABAG's water quality sampling program during 1976-78 that the numerous small watersheds of the Bay Area contribute a substantial amount of oil and grease to San Francisco Bay. These findings, summarized below, would indicate an extrapolated volume of oil and grease entering the Bay from surface runoff to be approximately one-half million gallons annually, which is equivalent to a major oil spill.

FLOW WEIGHTED CONCENTRATIONS OF OIL AND GREASE IN THE SAN FRANCISCO BAY AREA, 1976-78 RAINY SEASON

Land Use	Mean	Concentration, mg/l	
		Range	St. Dev.
Residential	6	5-8.3	1.5
Commercial	28	-	-
Industrial	25	5-33	14
Open & Agriculture	no data	-	-

Field data collected to date are not comprehensive enough for wide application in urban runoff modeling and are often confused by variations in sampling and analytical techniques. Oil is a complex mixture of many hydrocarbon compounds whose character ranges widely over extremes of solubility, volatility, density, surface active properties, toxicity and resistance to bio- and photochemical degradation. In particular, the varying solubility has prevented uniform assessment of the dissolved, emulsified and surface film fractions. Because the major portion of oil and grease encountered in urban runoff is not dissolved, expression of quantities in concentration units is misleading. Nevertheless this is a common practice.

Sources

The sources of oil and grease in stormwater are not well documented. However, it is known that oil is dumped into storm drains, oil leaks onto street surfaces and parking lots, and oil is emitted from moving vehicles on railways and roads. The major contributing substances are considered to be:

- o gasoline
- o lubricating oil
- o greases
- o animal and vegetable oils

Little of the oil and grease discharged through storm sewers originates in the rainfall. Data from Seattle, Washington indicate between 5 and 80 ug/l are measurable in unfiltered rainwater. These amounts result mainly from pyrolysis and incomplete combustion of fossil fuels.

It is generally accepted that the predominant contributor of storm sewer oil and grease loads is automotive crankcase oil. Lax car service station house-keeping practices, crankcase dripping, accidental spills, and surreptitious dumping all factor into this source. To a lesser extent industrial kerosene washings, cutting oil and cutting emulsions, waste dry cleaning fluids and automobile radiator fluids may reach urban runoff collection systems.

Several studies have monitored the amount of oil and grease in urban stormwater discharges. A high concentration of hydrocarbons occurs as a pulse in the runoff at the beginning of each storm. In urban Philadelphia, total hydrocarbons (THC) in stormwaters reached 8 mg/l initially, about four times the flow weighted mean concentration. About 14% of the THC was dissolved but as runoff progressed this proportion became smaller. THC discharges in terms of mass emission rates (kg/sec) are not usually maximum at the beginning of the storm but rather peak in response to the spatial/temporal intensity pattern, runoff factor and basin topography. In Seattle, urban runoff oil and grease levels of 0.2 and 16 mg/l have been reported although higher concentrations appear in the direct runoff of bridges, 6 to 24 mg/l, and highways, 10 to 60 mg/l. Up to 12 mg/l oil and grease was measured in the stormwater drainage system serving a predominantly residential and commercial section of Stockholm, Sweden. In general, the range of oils in urban stormwater falls between zero and 110 mg/l.

An analysis of petroleum pollution in the Delaware Estuary, which receives runoff from Philadelphia and Trenton, New Jersey, underscores the relative importance of urban stormwater inputs. The 1975 runoff oil source amounted to about 17% of the total input including spills as well as municipal and industrial effluents. Upon full implementation of point source effluent limitations (through NPDES permits), the runoff contribution rises dramatically to 40% of the total.

The toxic effects of hydrocarbons in stormwater runoff are not yet well known. In water oil adversely affects aquatic organisms by interfering with normal biological exchange processes, lowering resistance to infection and limiting reproductive success. In addition, oil acts as carrier for various toxic chemicals, especially chlorinated hydrocarbon pesticides, which are in general use and are commonly detectable in urban runoff. Various oil and grease control measures have been established for industrial uses but the transfer of the developed technology to urban stormwater runoff pollution problems has been insufficient so far. Contracts with the regulatory agencies in California indicate the growing need for local demonstration of an operational program.

Despite the well documented acute toxicity as well as long term sublethal toxicity of oils to aquatic organisms, there is very little general technical information on Best Management Practices for controlling oil and grease in stormwater runoff. Cost and effectiveness information is virtually nonexistent.

WATERSHED DESCRIPTION

The Richmond watershed is an urban watershed bordering the eastern shore of San Francisco Bay. The 2.2 square mile watershed is typical of other communities on the eastern side of the Bay. The lower portion of the watershed is flat and gently rises to the ridgeland hills for a total relief of 300 feet. The climate is mild, receiving approximately 20 inches of precipitation during the November-to-April period. Land use in the watershed is primarily residential (76%) with 12% commercial and 8% industrial. Two major highways, currently utilized at their full capacity, bisect the watershed. The watershed is separately sewered, with most of the storm runoff carried in lined channels. A thorough program to eliminate any illegal connections and discharges into the storm sewers has been completed by the City of Richmond Department of Public Works. The receiving water body is San Francisco Bay.

As part of ABAG's Surface Runoff Management Program, four storms (60 samples) were monitored at the Richmond Watershed during the 1976-77 rainy season. In addition to flow and other physical measurements, 15 water quality parameters were used to characterize the quality of runoff from this watershed. This, in addition to the base flow investigation at the site, provides an overall picture of urban runoff quality from the City of Richmond. It is substantially more polluted than outflow from the City of Richmond's secondary treatment plant. Although the collected data raise many questions as to the overall quality of the so called "rain water" after it passes through the City of Richmond's streets, a particular concern has been expressed regarding oil and grease. The data on oil and grease collected in the Richmond Watershed are shown below:

OIL AND GREASE CONCENTRATIONS IN STORMWATER RUNOFF - SAN FRANCISCO BAY AREA, mg/l

Watershed	Storm Date	Individual Samples	Composite Sample
Richmond	Feb. 8, 1977	4.9, 33.0, 27.0, 12.0	21.00
Richmond	Feb. 20, 1977	3.8, 5.7	* 4.5
Castro Valley	Feb. 20, 1977	1.9, 5.2, 1.9, 2.9, 4.3	4.30
Castro Valley	March 15, 1977	none	8.50
Calabasas	Dec. 19, 1976	none	7.30
San Jose	Nov. 11, 1976	none	44.30
Matadero	Nov. 11, 1976	none	41.50
	Dec. 29, 1976	none	14.00
	March 24, 1977	none	12.40

OBJECTIVE

The project will examine the problem and potential mitigation measures in a small watershed in Richmond. It is a small watershed of 2.2 square miles for which a good data base has been already established as part of ABAG's 1976-78 water quality sampling program. The project will build upon the existing data. This site was selected because it is believed to be typical

for the Bay Area in terms of the quantities of oil and grease in stormwater runoff. In addition, the problem is known to and acknowledged by City officials, and they have expressed interest in its mitigation (Appendix).

It is intended that this project should accomplish the following objectives:

1. Identify the specific concentration and components of oil and grease in stormwater runoff.
2. Identify the basic sources of oil and grease in the watershed and quantify the relative contributions from these sources.
3. Identify the BMPs most suited to resolving the problem.
4. Reduce the amount of oil and grease through appropriate control measure or measures installed in a selected demonstration area.
5. Determine the cost-effectiveness relationship of tested BMPs for control of oil and grease in stormwater runoff.
6. Develop coefficients for simulation and evaluation of oil and grease control effectiveness with a commonly applied mathematical model (SWMM) for easy transfer of results to other localities.

A discussion with EPA's NURP Project Manager revealed that such a project is not being undertaken for West Coast conditions and that local data must be obtained in order to apply any concepts developed in the eastern United States.

APPROACH

The problems of oil and grease in urban runoff and their control is understood far less than other problems of runoff such as sediments or nutrients. It is not feasible to attempt to find a solution in only one program year. Therefore, this project is proposed in two phases to be conducted over a two year period. It is expected that at the end of the first year, the study product could stand independently in its usefulness to other jurisdictions. There would be no mandated commitment to fund the second phase in order to complete a useful program. This approach permits the EPA maximum flexibility in assessing project results and making a determination on second year funding.

The following tasks are proposed for the conduct of this project:

PHASE I

Task 1 - Review of Literature

The technical literature on oil and grease occurrence and control in storm-water runoff will be reviewed. This would provide the data base for development of a more detailed sampling program and initial assessment of candidate control measures. Major sources of information about previous and ongoing research in this area are:

- o Smithsonian Information Exchange (ongoing programs)
- o Water Resources Research Center, University of Arizona (previous research)
- o "Oil/Water Separation: State of the Art," EPA-600/2-78-069
- o Industrial members of the ABAG Water Quality Technical Advisory Committee

Specific information sought in the literature review will include:

- o impacts and threshold levels of oil and grease pollution
- o sources of pollution
- o alternative mitigation measures
- o implementation experiences (in particular as part of 208 program)
- o benefits of controlling oil and grease (tainting of fish, cancer, aesthetics, resource recovery, multiple use of control facilities).

Schedule

July 1980 - October 1980

Product

This task will result in an assessment of and report on current knowledge about oil and grease in urban runoff and the state-of-the-art in control technology.

Responsibility

ABAG

Total Budget

16,000

Task 2 - Identification of Sources

This task will seek to better define the components and quantities of oil and grease discharged from the watershed. Water quality samples will be collected during the 1980-81 rainy season and analyzed for the various fractions comprising the aggregate known as oil and grease. The preliminary literature survey indicated that there may be a substantial variation in oil and grease concentration with time. Samples would be collected every half hour for the first two hours of a rainfall event and hourly thereafter. If early data analyses indicate relatively constant concentrations after the "first flush," final samples for any storm event may be composited.

Location of the sampling sites could greatly affect the quality of the data. A Sampling design effort would be undertaken in the first month. Sampling sites would be selected on the basis of information desired, accessibility, security and sampling needs. The City of Richmond would provide plans of storm sewers and drainage channels to aid in locating sites. Also, of particular concern, is the sampling methodology. It's not expected that a mechanical sampler could be found that would not suffer from oil adsorption to tubing surfaces (a common problem) or that would representatively sample a water column and a surface oil slick. These problems have significantly contributed to the sparsity of available data on oil and grease in stormwater. A manual sampling effort would probably be required.

This task also would establish a data base to establish the effectiveness of possible control measures. The size of the watershed (2.2 mi^2) is sufficient to obtain a good assessment of the pollution problem but it is too small to subdivide into control and demonstration areas. Thus sampling is needed before and after control measures are implemented.

A final objective of this task will be to identify the major sources of oils and grease in stormwater. This would be done in three ways. First, chemical analysis of collected water samples will identify the nature of the oils present. Analyses will be conducted to identify the following classes of oil and grease components:

- o Total oil and grease
- o Polar and non-polar fractions
- o Settleable, dissolved and adsorbed fractions
- o Gas chromatograph identification of major components

Total oil and grease concentrations would be analyzed for each discrete sample. Component analyses would be conducted on samples collected and composited for each station and each storm.

Second, samples for analysis will be collected, not only at the mouth of the watershed but also at areas of major potential impact. Such areas include trucking terminals, state highway, residential neighborhoods, commercial districts and automotive service stations.

Third, secondary factors such as vehicle activity, rainfall intensity and duration, land use, topography and others, that may affect oil and grease accumulation or discharge will be measured and quantified.

Schedule

July 1980 - October 1980 - sampling design

November 1980 - March 1981 - sampling

Product

The sampling and field data collection effort will identify:

- o The chemical nature of the oil and grease pollutants
- o The physical transport mechanisms (dissolved, suspended, absorbed, floating)
- o A baseline discharge for assessing the effectiveness of control measures.

Responsibility

RAMLIT Associates and laboratory contractor with the assistance of the City of Richmond.

Total Budget

\$38,000

Task 3 - Data Analysis and Recommendations on Control Strategy

Data collected under Task 2 would be analyzed in order to assess source significance and develop a control strategy. The relative mass emissions of oil and grease from the identified sources (terminals, dumping, service stations, etc.) would be correlated, using multiple regression or log transform analysis, with various factors such as land use, topography, rainfall intensity, rainfall duration, soil type, vehicle activity and others yet to be identified. Their analysis would establish the input data to the SWMM model (Tasks 4 and 9), which would be the vehicle for translating study results to other watersheds. Further, such analysis, along with the chemical and physical analysis of water quality samples, will be used to establish an overall control strategy. For example, if the bulk of oil and grease appears due to illegal dumping, restricted storm sewer access and alternate disposal sites would be considered as prime control strategies.

Schedule

January 1981 - April 1981

Product

The products of this task would include:

- o A report identifying the relative importance of sources of oil and grease in the watershed
- o A report identifying the influence of local factors (such as rainfall, land use, vehicle activity) on the generation of oil and grease
- o A recommended strategy for the control of oil and grease that would identify high priority targets for control and establish levels of control needed for the protection of receiving water quality.

Responsibility

ABAG with the assistance of the City of Richmond

Total Budget

\$26,000

Task 4 - Model Calibration

One of the major objectives of the proposed projects is to produce results transferable to other watersheds in the Bay Area, and possibly California. Results expected in the first phase of this project would include information on the sources of oil and grease and the factors affecting generation and discharge rates. An appropriate vehicle for translating this information to other watersheds is the SWMM model (Stormwater Management Model). This model has been used in the demonstration watershed and is available to the project. The data collected in Task 2 and analyzed in Task 3 would be used to calibrate the SWMM model specifically for oil and grease emissions. The model could then be used to mathematically simulate stormwater related oil and grease emissions.. ABAG would make this calibrated model available to other Bay Area cities and counties for use in non-point source planning.

Schedule

March 1981 - June 1981

Product

The SWMM model would be calibrated for the various factors affecting oil and grease emissions in the Richmond watershed. This model would be made available to other cities and counties.

Responsibility

ABAG

Total Budget

\$15,000

Task 5 - Identification of Most Appropriate BMPs

Traditionally oily wastewaters have been treated with gravity separators. The American Petroleum Institute specifies separators based on removal of free oil globules larger than 0.15 mm. However, a substantial portion of the emulsified oil occurs in smaller micelles. The newer treatment strategies designed to remove this finer fraction involves heat treatment, chemical coagulation, electrostatic precipitation or flow-through porous filter beds. The cost effectiveness of most of these processes is currently speculative.

The treatment regimes which remove free oil are ineffective in removal of dissolved petroleum hydrocarbons. These may be treated through biological processes or more expensively by activated carbon absorption, reverse osmosis or dialysis.

The time-concentration relationships reported for oil discharges in urban runoff suggest diversion and storage of the initial stormwater pulse. Having the highest hydrocarbon concentrations, removal of an incremental amount of contaminant could be least expensive with this water. The COD concentration peak in the runoff also occurs in the initial pulse and could be simultaneously prevented from entering the receiving water. The fraction of the total runoff that could be diverted and the appropriate subsequent treatment processes need further study.

The most direct and potentially least costly control practices involve source control. Oils that are prevented from reaching the street, or those that are diverted before entering a storm sewer are at their highest concentrations for removal. Examples of management practices that would be considered include oil recycling incentives, diversion structures or traps for high use areas such as gasoline stations or trucking terminals, and storm drain access control.

This task will evaluate industrial, structural, and non-structural control measures for application within the watershed.

Candidate control measures for evaluation identified at this time include:

Structural -

- o Source isolation
- o Passive gravity separation
- o Mechanically assisted gravity separation
- o Filtration
- o Adsorption and removal
- o Chemical dispersion
- o Storm drain access control

Non-structural -

- o Oil recycling
- o Stormwater discharge permits
- o Education of public
- o Zoning restrictions

Schedule

August 1980 - March 1981

Product

This task will result in a report containing an assessment of the relative merits, weaknesses, costs and benefits of alternative control measures, and recommendations for implementation in the watershed.

Responsibility

ABAG

Total Budget

\$15,000

Task 6 - Design Specifications for Selected Control Measures

Before an identified control measure can be implemented or constructed, it is essential that an adequate design be developed. Design parameters include such essential facts as sizing, materials of construction, recommended vendors, and, for specific projects, drawings or construction specifications. For non-structural control measures, such as possibly subsidized oil recycling stations, design specifications could include incentives to collection stations, reimbursement to consumers, frequency of use, size of storage, method of collection and so forth. All control measures will need detailed plans for the collection of retained oils and final disposal, either by reprocessing, wastewater treatment or landfilling in an approved site.

Efforts under this task will be directed toward the development of detailed design specifications for the installation and/or implementation of selected Best Management Practices. These specifications will be tailored to the characteristics and actual conditions of the study watershed. It is intended that these specifications would be used to develop detailed construction drawings for demonstration facilities (if necessary) at the close of the first project year. It is also intended that these specifications would contain sufficient detail and information that they would be applicable for demonstration projects in other watersheds. The City of Richmond would provide plan review and approval for those facilities to be constructed in the second project year.

Schedule

January 1981 - June 1981

Product

Detailed design specifications would be prepared for demonstration Best Management Practices selected on the basis of probably effectiveness and low cost. Construction drawings and documents, and implementation plans for non-structural measures, would be prepared for the watershed demonstration measures. City permits and approvals would also be obtained.

Responsibility

RAMLIT Associates and ABAG with the assistance of the City of Richmond

Total Budget

\$63,000

Task 7 - Provide Management and Reporting

Management of the project involves coordination of staff, consultants and City of Richmond personnel. Contracts must be administered and reports presented to the Regional Planning Committee and the ABAG Executive Board. Close liaison will be maintained with the EPA Project Officer and interested parties from the State Board.

Technical assistance will be sought and obtained from the ABAG Water Quality Technical Advisory Committee which includes members from private industry, consulting firms, local government and several state and federal agencies, including the Regional Board. This Committee would bring an expanded perspective and experience to the project in addition to providing peer review of the technical products.

Quarterly progress reports will be submitted to EPA. The reports will cover progress to date, results, problems, corrective measures, and an estimate of the next quarter's effort.

A year end project report would be submitted to EPA. This report would cover the same topics as the quarterly reports, yet would also include methodology, data analysis, findings and recommendations.

Schedule

July 1980 - June 1981

Products

The products of this task would include coordination of project staff and activities, three quarterly reports and a year end report

Responsibility

ABAG

Total Budget

\$15,000

Task 8 - Conduct Public Information and Participation Program

Dissemination of information on this program will occur mainly when the results of the studies are known and best management practices are being proposed to control runoff of oil and grease into Bay Area waters.

The ABAG Public Affairs staff will:

- 1) Assist with the development of graphics, printed materials and presentations for the ABAG Water Quality Technical Advisory Committee, Bay Area Citizens Advisory Committee, Regional Planning Committee, and other concerned groups.
- 2) Handle physical arrangements, agendas, mailings and publicity for advisory meetings, workshops and any public hearings that may be required.
- 3) Work with affected persons and groups in the community to explain the purposes of the study and how it may affect them.
- 4) Maintain liaison with concerned government agencies and water-related organizations.
- 5) Maintain mailing lists for informational materials, meeting notices and news releases.
- 6) Handle media contacts related to the program as it develops.

Schedule

July 1980 - June 1981

Product

Advisory and policy committee meetings; public meetings and hearings; news media interviews and stories; fact sheets and plan summary; mailing lists; correspondence and responses to telephoned and written inquiries and public comments; articles for professional meetings and publications; responsiveness summary and evaluations; adopted best management practices.

Responsibility

ABAG

Total Budget

\$12,000

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